J. W. HARTLEY.

Manufacture of Tiles and Slabs.

No. 219,579. Patented Sept. 16, 1879.

Fig. 1

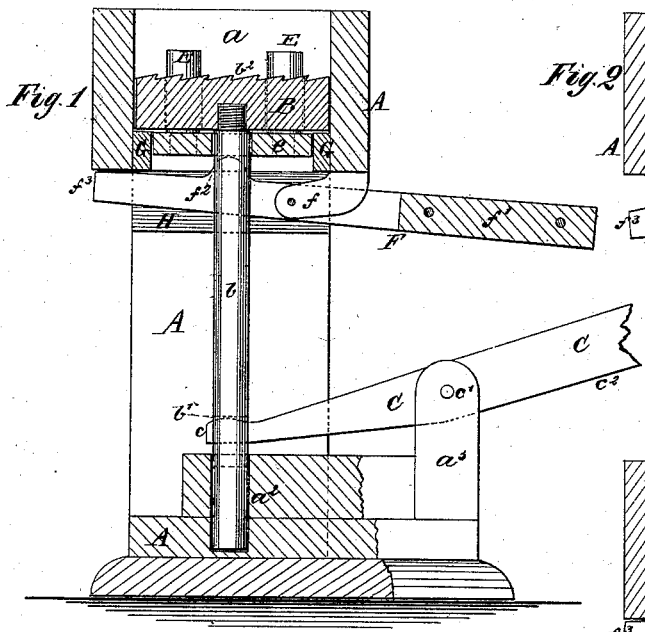


Fig. 2

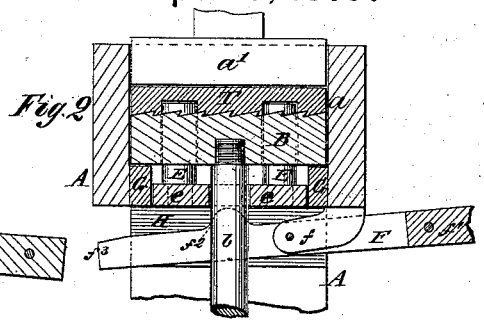


Fig. 3

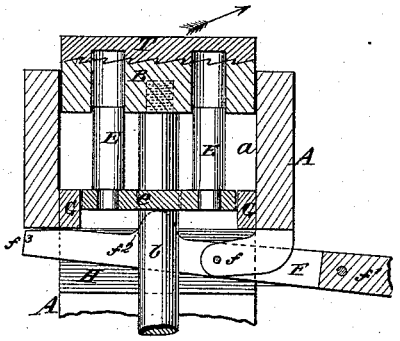


Fig. 4

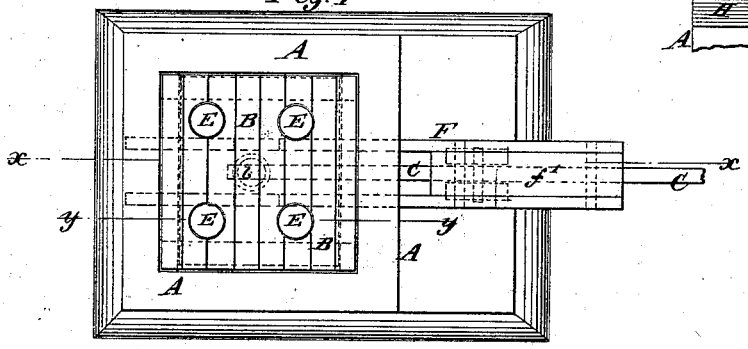


Fig. 5

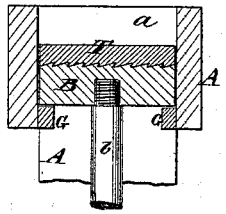


Fig. 6

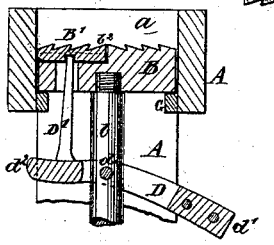


Fig. 8

Fig. 9

Fig. 10

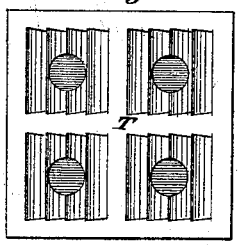
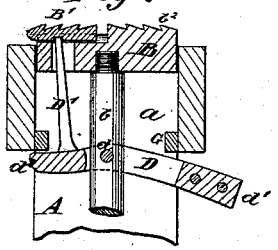


Fig. 7



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UNITED STATES PATENT OFFICE.

JOHN WILLIAM HARTLEY, OF STOKE-UPON-TRENT, ENGLAND, ASSIGNOR TO HIMSELF AND JOHAN ROBERT ALSING, OF STOCKHOLM, SWEDEN.

IMPROVEMENT IN THE MANUFACTURE OF TILES AND SLABS.

Specification forming part of Letters Patent No. **219,579**, dated September 16, 1879; application filed July 26, 1879.

To all whom it may concern:

Be it known that I, JOHN WILLIAM HARTLEY, of Stoke-upon-Trent, in the Kingdom of England, have invented a new and useful Improvement in the Manufacture of Tiles and Slabs, of which the following is a specification.

The object of my invention is to provide an improved mode of dovetailing or undercutting the backs of encaustic and other tiles, to make them firmly adhere to the cement when fixing them to the walls and ceilings of buildings, and without detriment to the evenness of their density.

The invention consists in the mode of undercutting tiles, and in the construction and combination of the various parts of the apparatus employed therefor, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical section, through the line *x x* of Fig. 4, of the lower part of a machine or press constructed according to my invention for manufacturing undercut tiles, the die and plungers being in position to receive the dust or semi-dry clay for compression into tiles. Fig. 2 is a similar section of the same in position of having formed the tile by compressing the dust by the descending follower of the press, the die being shown in section through the line *y y* of Fig. 4. Fig. 3 is a similar section of the same in position for removing the completed tile. Fig. 4 is a top or plan view of the same. Fig. 5 is a vertical section of a modification of the same, in which the die has no plungers. Fig. 6 is a vertical section of a modification of the said press, in which the working-surface of the lower die is formed of two pieces, one sliding laterally upon the other, and in position to receive the dust for compression. Fig. 7 is a similar section of the same in position for removing the completed tile. Fig. 8 shows a cross-section of tiles made according to my invention. Fig. 9 shows a modification of the ridges of the die. Fig. 10 is a plan view of the under side of a tile.

Similar letters of reference indicate like parts.

A represents the frame of the press, forming also the four sides of the box or mold *a*, in which the semi-dry dust or clay is placed and compressed into tile by the descending follower a^1 of the press.

The bottom of the mold is the lower die, B, which is fitted to slide up and down in the box *a*, and is secured upon the upper end of a vertical spindle, *b*, whose lower end fits in a guide-socket, a^2, in the lower part of the frame A.

The spindle *b* has a central mortise, b^1, through it, in which is inserted one end, *c*, of a foot-lever, C, fulcrumed at c^1 between lugs a^3 on the frame A.

When it is desired to remove the completed tile from the mold the die B is raised to the position shown in Fig. 3 by depressing the end c^2 of the lever C.

The face of the die B is serrated with parallel ridges b^2 across its surface, the points of the serrations being undercut, so that their upright edges form an acute angle with the horizontal. By this construction of the die it is evident that the tile cannot be lifted from the die vertically; but the angles of the undercutting being all in one direction, it will be seen that when the tile T is made as in Fig. 2, and raised from the mold *a* by elevating the die B, as in Fig. 3, it can easily be removed from the die in a sidewise direction, as indicated by the arrow.

When the tile is fixed to the wall the adjacent tile prevents the said sidewise movement, and the tile cannot be displaced from the wall without considerable force.

When two tiles are placed together with the angles of undercutting in opposite directions, as shown in Fig. 8, they are mutually self-sustaining. To make a single tile self-sustaining on the wall, the angles of undercutting may be made in opposite directions on the same tile, and still the latter conveniently released from the die by making a suitable surface-portion, B′, of the die B (see Figs. 6 and 7) slide upon dovetails attached to the latter, and making the ridges of the loose portion face those of the fixed portion. A bell-crank lever, D, fulcrumed at *d* to the spindle *b*, and having a counter-weight, d^1, is fitted with the upper end of its arm D′ in a notch in the under side of the sliding piece B′, and has a toe, d^2, projecting under the side of the mold-box *a*.

With the die in the position of Fig. 6, the

tile is compressed in the usual way, and when lifted from the mold by the spindle *b*, as in Fig. 7, the toe d^2 of the bell-crank strikes and stops under the side of the mold before the spindle has ceased ascending, thus causing the arm D′ of the bell-crank lever to slide the loose portion B′ slightly apart from the fixed portion of the die B and release the tile from the undercut points of the ridges b^2. On the spindle *b* descending, the weight d^1 of the bell-crank lever causes the arm D′ to move toward the spindle, and thus again close the sliding portion B′ against the fixed portion of the die B.

When it is desired that each tile should have an absolute dovetail and hold upon the cement independent of any adjacent tiles, I also employ, together with the serrated die B, plungers E, passing through the lower die, B, and attached to a plate, *e*, beneath the die B. Through the center of the plate *e* is a hole of suitable size to receive the spindle *b* and allow the said plate and spindle to be moved up and down independent of each other. The plungers E are raised and retained with their upper ends projecting a suitable distance above the die B by a forked lever, F, which is fulcrumed to a lug, *f*, on the frame A, and has a counter-weight, f^1, a projection, f^2, on each prong of its fork pressing at opposite sides of the spindle on the under side of the plate *e*, to elevate the plungers until the end f^3 of the lever F strikes and stops underneath the side wall of the mold *a*. The mold being filled with semi-dry clay-dust, and the follower or upper die, a^1, allowed to descend to compress it into a tile, the plate *e*, with the plungers E attached, gradually sinks until it rests upon the cleats H, or bed-plate of the press, or other suitable stop, while the die B remains stationary, similarly supported upon suitable cleats G above the bed-plate or cleats H.

Thus the tile T is uniformly compressed, with the plungers, when at rest, still projecting over the surface of the die B, as in Fig. 2, sufficiently to leave sockets in the tile, which sockets, when filled with cement on the wall, will prevent the displacement of the tile sidewise in any direction.

When the die is raised, as in Fig. 3, the plungers raise to their former position, but no higher, and are thus withdrawn from the tile, leaving no obstruction to the removal of the latter in the direction of the arrow, as before stated. The plungers may be of any convenient form and number.

In pressing tiles of plastic clay the plungers do not need to sink down in the operation, and may be secured to the bed-plate of the press or other suitable stationary part. I make the serrated ridges of any convenient form or number, those illustrated in Fig. 9 being most suitable for the uniform compression of the dust or clay.

The advantage of the serrated surface just described is that it locks the tile on the wall or ceiling, and when in manufacture it prevents the dust, during compression, in a very great degree, from being of unequal density, and, by means of the inclined planes and plungers, enables the indents to be made much deeper than has heretofore been possible.

I am aware that undercutting tiles has been accomplished by solid dovetail tapered pieces raised above and fixed to the surface of the die. In this method the dust is compressed around the dovetail pieces, and the tile, when raised clear of the mold, is forcibly withdrawn horizontally from the tapered dovetail blocks. The tile in this method gripes the dovetail blocks and requires so much force in removal as to be frequently destroyed. The operation requires much longer time, and the thickness of the dovetail blocks above the surface of the mold causes the clay to be uneven in density, great loss being thereby occasioned in firing.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The mode herein shown and described of undercutting or dovetailing the back of tiles, viz., by means of serrated and undercut ridges arranged upon the surface of the die used in forming the tile.

2. The combination, with the ridged die B, of plungers E, arranged to partly recede under the pressure and to be withdrawn through the die B, substantially as and for the purpose specified.

3. In combination with the die B, the sliding portion B′, having its ridges placed to face those of the main portion, and being arranged to separate automatically from the main portion sufficiently to release the tile when the spindle *b* is raised, substantially as specified.

The above specification of my invention signed by me this 27th day of May, 1879.

JOHN WILLIAM HARTLEY.

Witnesses:

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JNO. FANSHAWE.